An Early Radiocarbon Chronology for the Hawaiian Islands: A Preliminary Analysis

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ARCHAEOLOGICAL EVIDENCE KNOWN for the Hawaiian Islands up to about 1985 led most archaeologists to accept a date for initial settlement by approximately A.D. 500–600 (e.g., Bellwood 1978; Jennings 1979). As new dates were announced, many archaeologists shifted their estimate for Hawaiian settlement to approximately A.D. 300–400 (e.g., Bellwood 1987; Kirch 1985), and some recognized the potential for even earlier dates with additional field research (e.g., Kirch 1986:31). The corpus of radiocarbon dates available to date, when considered in their entirety, may be suggestive of colonization of the Hawaiian Islands significantly earlier than has been generally accepted. The purpose of this article is to further analyze and evaluate the earliest radiocarbon chronology now available for the Hawaiian Islands. In so doing, it (1) provides an overview of Hawaiian dates with ranges (those with the highest probability at one standard deviation) that fall within the first millennium A.D.; (2) employs the latest advances in the calibration of radiocarbon dates, including the new curves for marine samples; and (3) analyzes synthetically the dates and their implications for the colonization and earliest centuries of Hawaiian prehistory.

THE EARLY HAWAIIAN RADIOCARBON CORPUS

For the purposes of the analysis, early Hawaiian radiocarbon dates were defined as those greater than 950 years B.P. (i.e., in conventional radiocarbon years, uncalibrated; see Stuiver and Polach 1977 on conventions in reporting), including the range for a date at a single standard deviation. All available dates that met this criterion, for which verifiable data could be obtained, were collected for analysis. Our search resulted in 113 early radiocarbon age-determinations for the Hawaiian Islands. When these dates are corrected for secular, and as needed, for estimated ^{13}C fractionation and reservoir effects, there remain 78 calibrated (calendrical) dates that, at one standard deviation, have an age-range that is entirely, or in part, earlier than A.D. 1000. This corpus of 78 dates is the basis of this analysis and discussion.

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CALIBRATION OF THE RADIOCARBON DATES

The early dates analyzed for Hawai'i were culled from both published and unpublished sources. It is clear that not all existing early radiocarbon dates have been made available in either published or unpublished form, and these additional results could be added to the analysis at some future time. The available dates were taken as conventional radiocarbon age B.P. (as reported) or corrected to meet standards for conventional dates (see below), and calibrated using the most recently established curves for both secular (Stuiver and Becker 1986) and reservoir effects, including corrections for the geographic differences in reservoir age (Stuiver et al. 1986). A Delta-R value of 115 ± 50 has been applied to marine samples as established for Hawai'i (from a single O'ahu sample; see Stuiver et al. 1986: Fig. 10b and Table 1). All radiocarbon calibrations, for both terrestrial and marine samples, were conducted using a FORTRAN micro-computer program provided by M. Stuiver and P. Reimer (1986) of the Quaternary Research Center, University of Washington (version 2.0 was used). Use of this program enabled calculations of the most probable age ranges for dates at one and two standard deviations (Table 1; Fig. 2).

Analysis of Hawaiian dates was made with the knowledge or assumption that all the following conditions have been adequately met. (1) Dates were calculated using the conventional 5568 half-life, unless otherwise specified. Dates calculated using the "new" half-life of 5730 were converted by division (e.g., correct conventional B.P. = 5730 half-life radiocarbon age B.P./1.029). (2) The statistical error assigned to the radiocarbon age estimate does not include a laboratory error multiplier. The "error multipliers" used by some laboratories based on their overall reproducibility

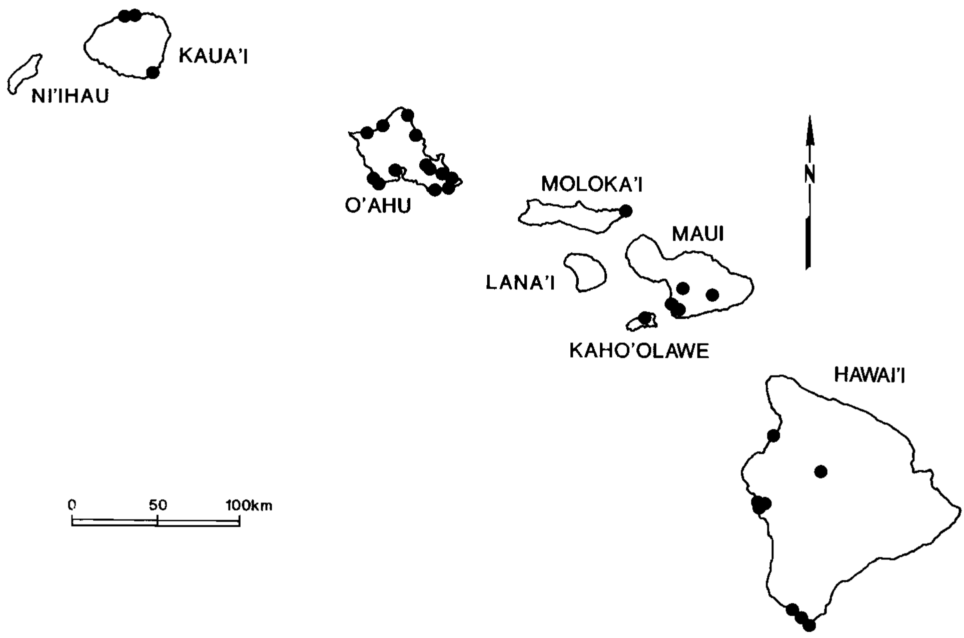

Fig. 1. The major Hawaiian Islands (Nihoa Island is not shown) showing site locations with early dates.

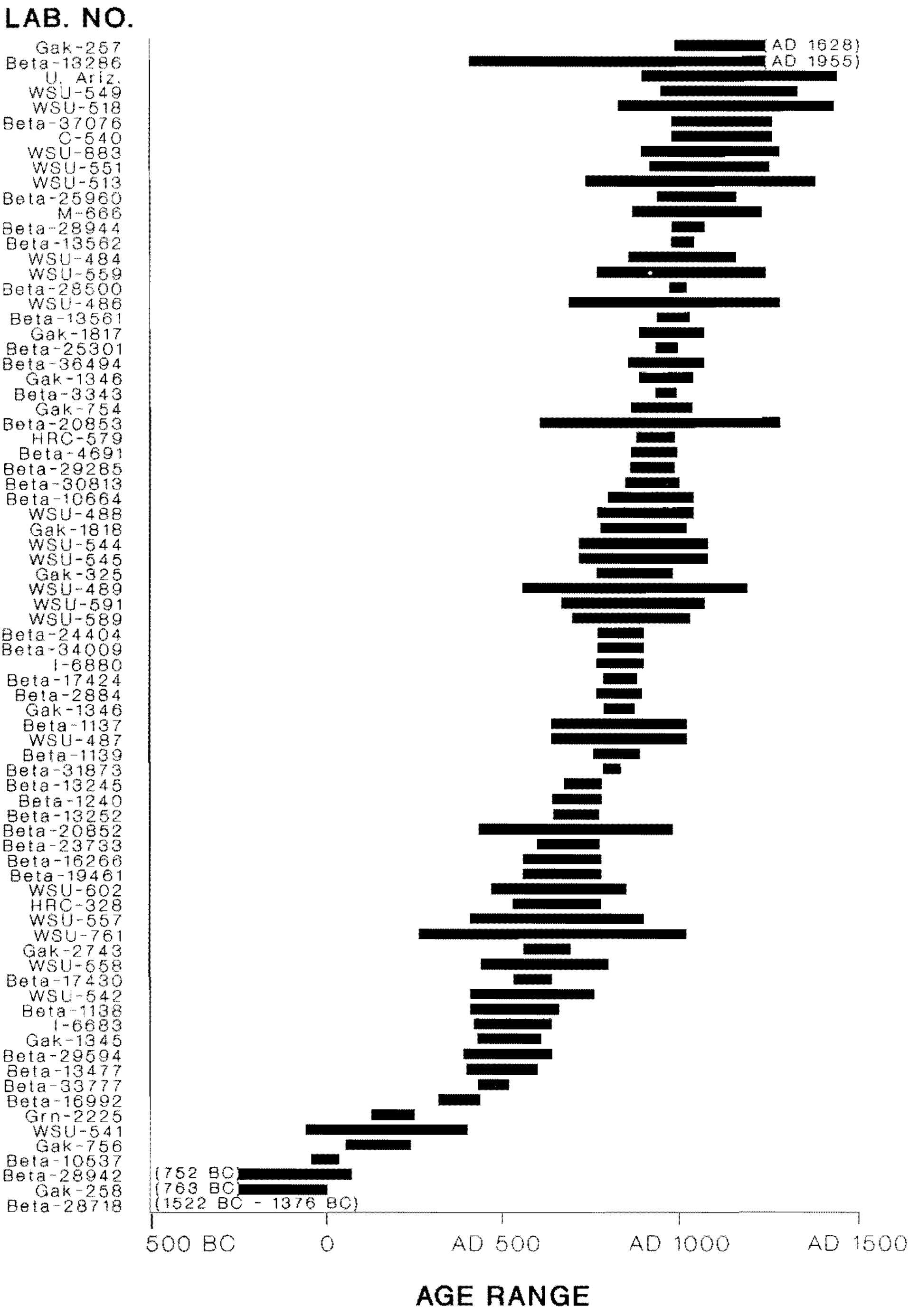

Fig. 2. Most probable calibrated age range for early radiocarbon dates at 1σ.

TABLE 1. Radiocarbon Dates by Island

SITE	LAB. NO.	MATERIAL	^{14}C AGE YRS. B.P.	^{13}C AGE YRS. B.P.[1]	CAL A.D. RANGE $(1\sigma)^2$	CAL A.D. RANGE $(2\sigma)^2$	REFERENCE
Hawai'i							
9962	Beta-13252	charcoal	1280 ± 70	1310 ± 70	647–774	599–888	Landrum et al. 1990
9964	Beta-13245	charcoal	1250 ± 60	1250 ± 60	677–781	652–895	Landrum et al. 1990
Kahakahakea	Gak-1345	charcoal	1530 ± 100		430–610	320–670	Soehren 1966
Kahalu'u	Beta-10664	charcoal	920 ± 120	1080 ± 120	800–1040	680–1160	Hay et al. 1986
Kapu'a Mauka	Beta-25301	charcoal	1110 ± 50	1090 ± 50	935–995	857–1022	Haun & Walker 1988
Keauhou	Gak-756	charcoal	1860 ± 80		54–239	89 B.C.–377	Soehren 1966
Keauhou	Gak-1346a	charcoal	1230 ± 80		786–875	657–908	Carter & Somers 1990
Keauhou	Gak-1346b	charcoal	1040 ± 80		889–1040	847–1162	Carter & Somers 1990
Kuakini	Beta-2884	charcoal	1200 ± 60		768–894	683–907	Schilt 1984
Pōhakuloa	Beta-13561	charcoal	1080 ± 60	1040 ± 60	939–1031	866–1075	Streck 1986
Pōhakuloa	Beta-13562	charcoal	1050 ± 50	1000 ± 50	981–1043	942–1160	Streck 1986
Pu'uali'i	Gak-257	charcoal	680 ± 360		990–1628	640–1955	Emory & Sinoto 1969
Pu'uali'i	Gak-258	charcoal	2250 ± 250		763 B.C.–1	900 B.C.–319	Emory & Sinoto 1969
Pu'uali'i	Grn-2225	charcoal	1826 ± 60		127–249	53–264	Emory & Sinoto 1969
Pu'uali'i	WSU-484	charcoal	1025 ± 180		860–1160	660–1280	Emory & Sinoto 1969
Pu'uali'i	WSU-557	shell	1460 ± 230	1870 ± 240	410–900	110–1160	Emory & Sinoto 1969
Pu'uali'i	WSU-589	urchin	1240 ± 150	1650 ± 166	700–1030	550–1240	Emory & Sinoto 1969
Pu'uali'i	WSU-591	urchin	1230 ± 190	1640 ± 202	670–1070	460–1290	Emory & Sinoto 1969
Pu'uali'i	WSU-602	urchin	1450 ± 160	1860 ± 175	470–850	260–1030	Emory & Sinoto 1969
Pu'uali'i	WSU-761	charcoal	1350 ± 350		264–1019	92 B.C.–1376	Emory & Sinoto 1969
Pu'uali'i	WSU-883	charcoal	900 ± 230		895–1280	660–1440	Emory & Sinoto 1969
Wai'Ahukini	M-666	charcoal	993 ± 200		870–1230	650–1320	Emory et al. 1959
Wai'Ahukini	WSU-486	charcoal	965 ± 310		691–1280	430–1616	Emory & Sinoto 1969
Wai'Ahukini	WSU-487	charcoal	1195 ± 210		640–1020	430–1260	Emory & Sinoto 1969
Wai'Ahukini	WSU-488	charcoal	1100 ± 140		770–1040	660–1190	Emory & Sinoto 1969
Wai'Ahukini	WSU-489	charcoal	1185 ± 320		560–1190	135–1410	Emory & Sinoto 1969
Wai'Ahukini	WSU-513	shell	1035 ± 310	1445 ± 318	740–1380	430–1650	Emory & Sinoto 1969
Wai'Ahukini	WSU-518	fish bone	1120 ± 315	1365 ± 317	830–1430	540–1690	Emory & Sinoto 1969
Wai'Ahukini	WSU-541	urchin	1905 ± 170	2315 ± 184	60 B.C.–400	340 B.C.–610	Emory & Sinoto 1969
Wai'Ahukini	WSU-542	urchin	1525 ± 140	1935 ± 157	410–760	220–940	Emory & Sinoto 1969

Wai'Ahukini	WSU-544	shell	1195 ± 160	1605 ± 175	720–1080	580–1280	Emory & Sinoto 1969
Wai'Ahukini	WSU-545	urchin	1195 ± 160	1605 ± 175	720–1080	580–1280	Emory & Sinoto 1969
Wai'Ahukini	WSU-549	shell	965 ± 220	1375 ± 212	950–1330	700–1490	Emory & Sinoto 1969
Wai'Ahukini	WSU-551	shell	1045 ± 150	1455 ± 166	920–1250	720–1370	Emory & Sinoto 1969
Wai'Ahukini	WSU-558	shell	1485 ± 160	1895 ± 175	440–800	230–1010	Emory & Sinoto 1969
Wai'Ahukini	WSU-559	urchin	1120 ± 200	1530 ± 212	770–1240	580–1400	Emory & Sinoto 1969
Waikoloa	Beta-28942	charcoal	2150 ± 270	2180 ± 270	752 B.C.–70	893 B.C.–410	Jensen 1989
Waikoloa	Beta-28944	charcoal	960 ± 70	990 ± 70	982–1071	936–1210	Jensen 1989
Maui							
Haleakalā	Gak-325	charcoal	1160 ± 100		770–980	660–1030	Soehren 1963
Kēōkea	Beta-30813	charcoal	1020 ± 100	1110 ± 100	850–1000	680–1050	Brown et al. 1989
Mākena	Beta-37076	charcoal	930 ± 80	950 ± 180	980–1260	760–1320	BPBM ^{14}C File[3]
Pu'unaio	U. Ariz.[4]	rat bone	770 ± 350		898–1440	583–1955	James et al. 1987
Kaho'olawe							
Kaulana	Beta-4691	charcoal	1110 ± 70	1110 ± 70	867–996	730–1030	Hommon 1983
Moloka'i							
Hālawa	Gak-2743	charcoal	1380 ± 90		559–694	529–782	Kirch & Kelly 1975
O'ahu							
Barbers Pt.	Beta-25960	charcoal	990 ± 120		940–1160	850–1260	BPBM ^{14}C File
Bellows	Beta-20852	charcoal	1350 ± 230	1330 ± 230	434–980	230–1189	Spriggs 1987
Bellows	Beta-20853	charcoal	1070 ± 370	1070 ± 370	608–1280	179–1623	Spriggs 1987
Bellows	Gak-1817	charcoal	1030 ± 110		890–1070	732–1230	Pearson et al. 1971
Bellows	Gak-1818	charcoal	1110 ± 120		780–1020	670–1160	Pearson et al. 1971
G5-101	Beta-13286	charcoal	750 ± 900		410–1955	790 B.C.–1955	Kurashina et al. 1985
Hale'iwa	Beta-28718	charcoal	3220 ± 70	3160 ± 70	1522 B.C.–1376 B.C.	1607 B.C.–1291 B.C.	BPBM ^{14}C File
Kahana	I-6683	charcoal	1515 ± 120		420–640	250–730	Hommon & Bevacqua 1973
Kahana	I-6880	charcoal	1190 ± 85		768–901	669–988	Hommon & Bevacqua 1973
Kahuku Pt.	Beta-10537	charcoal	2070 ± 50	1990 ± 50	45 B.C.–32	115 B.C.–82	Bath et al. 1984
Kaka'ako	Beta-19461	charcoal	1330 ± 120	1340 ± 125	560–780	530–900	Clark 1986
Kāne'īlio Pt.	HRC-579[5]	charcoal	1110 ± 50		881–987	848–1001	BPMB ^{14}C File
Kāne'ohe	Beta-31873	charcoal	1250 ± 60	1230 ± 60	787–834	660–902	BPMB ^{14}C File
Kawai Nui	Beta-1137	charcoal	1210 ± 215		640–1020	410–1260	Kelly & Clark 1980
Kawai Nui	Beta-1138	charcoal	1500 ± 145		410–660	230–847	Kelly & Clark 1980
Kawai Nui	Beta-1139	charcoal	1220 ± 90		759–889	654–982	Kelly & Clark 1980

continues

TABLE 1. *Continued.*

SITE	LAB. NO.	MATERIAL	^{14}C AGE YRS. B.P.	^{13}C AGE YRS. B.P.[1]	CAL A.D. RANGE (1σ)[2]	CAL A.D. RANGE (2σ)[2]	REFERENCE
Kawai Nui	Beta-3343	charcoal	1092 ± 50		935–993	857–1021	BPBM ^{14}C File
Kuli'ou'ou	C-540	charcoal	946 ± 180		980–1260	760–1320	Emory et al. 1959
Luluku	Beta-13477	charcoal	1560 ± 100		400–600	320–660	Allen 1987
Luluku	Beta-16266	charcoal	1330 ± 150		560–780	410–1000	Allen 1987
Luluku	Beta-28500	charcoal	1120 ± 50	1050 ± 50	975–1021	866–1043	BPBM ^{14}C File
Luluku	Beta-33777	charcoal	1570 ± 60	1530 ± 60	432–518	411–640	BPBM ^{14}C File
Maunawili	Beta-29285	charcoal	1160 ± 70	1120 ± 70	865–988	768–1024	BPBM ^{14}C File
Mokulē'ia	Beta-24404	charcoal	1140 ± 60	1180 ± 60	773–901	762–982	Bath 1987
Waikalua	Beta-34009	charcoal	1200 ± 60	1180 ± 60	773–901	762–982	BPBM ^{14}C File
West Beach	Beta-16992	charcoal	1630 ± 90	1650 ± 90	320–439	212–584	Davis & Haun 1987
West Beach	Beta-17424	charcoal	1270 ± 90	1230 ± 90	786–882	650–980	Davis & Haun 1987
West Beach	Beta-17430	charcoal	1490 ± 70	1490 ± 70	533–640	419–659	Davis & Haun 1987
West Loch	Beta-23733	charcoal	1300 ± 90	1350 ± 90	599–775	540–890	Dicks et al. 1987
Kaua'i							
4001	Beta-29594	charcoal	1420 ± 130	1550 ± 130	390–640	178–759	Walker & Rosendahl 1990
475	Beta-36494	charcoal	1010 ± 150	1050 ± 150	860–1070	680–1230	Walker & Rosendahl 1990
Hanalei	Beta-1240	charcoal	1290 ± 95		644–781	580–904	BPBM ^{14}C File
Lumaha'i	HRC-328[5]	charcoal	1370 ± 190		530–780	240–1020	BPBM ^{14}C File
Nihoa							
N60	Gak-754	charcoal	1060 ± 90		867–1037	771–1164	BPBM ^{14}C File

[1] Non-marine samples lacking information on $^{12}C/^{13}C$ fractionation were calibrated based on ^{14}C ages. $^{12}C/^{13}C$ fractionation was estimated for marine samples after Stuiver & Polach (1977:358).
[2] Calibrated dates are reported as the most probable age ranges after Stuiver & Reimer's (1986) CALIB Program (rev. 2.0).
[3] BPBM ^{14}C File is an index of radiocarbon dates on file at the Department of Anthropology, Bernice Pauahi Bishop Museum, Honolulu.
[4] Date is reported without laboratory number in James et al. (1987:2353); age determination by the University of Arizona Tandem Accelerator Mass Spectrometer (TAMS).
[5] Original laboratory number is not available. The given Hawaii Radiocarbon (HRC) number is from a secondary indexing system employed by the Department of Anthropology, Bernice Pauahi Bishop Museum, Honolulu.

would be explicitly stated if used in conjunction with the reporting of radiocarbon determinations. (3) Dates given as conventional remain uncorrected for specific ^{14}C activity (the reservoir effect). (4) A date presented as conventional radiocarbon age B.P. already includes a correction for isotope fractionation (following conventions established in Stuiver and Polach 1977:356–357). In cases where marine samples (shell, sea urchin, fish bone, or scales) lack a correction for isotope fractionation (i.e., a ratio determined in the laboratory), the ratio was estimated on the basis of the material dated (see Stuiver and Polach 1977:358; Taylor 1987:122). Other (non-marine) samples lacking ^{13}C fractionation were not corrected (with estimates of the ^{13}C ratio) as the resulting differences in age prove negligible (cf. Stuiver and Polach 1977:358; Taylor 1987:121–122). Our results are, at least for now, limited by the extent to which these conditions have been adequately met.

THE EARLY RADIOCARBON CHRONOLOGY

Hawai'i Island

There are at present 38 radiocarbon dates from Hawai'i Island that when calibrated have ranges into the first millennium A.D. (see Table 1; Fig. 4). These dates come from ten localities in the island's leeward (western) zone (Fig. 1). Fourteen of these were determined from marine samples (shell, sea urchin, and fish bone); the

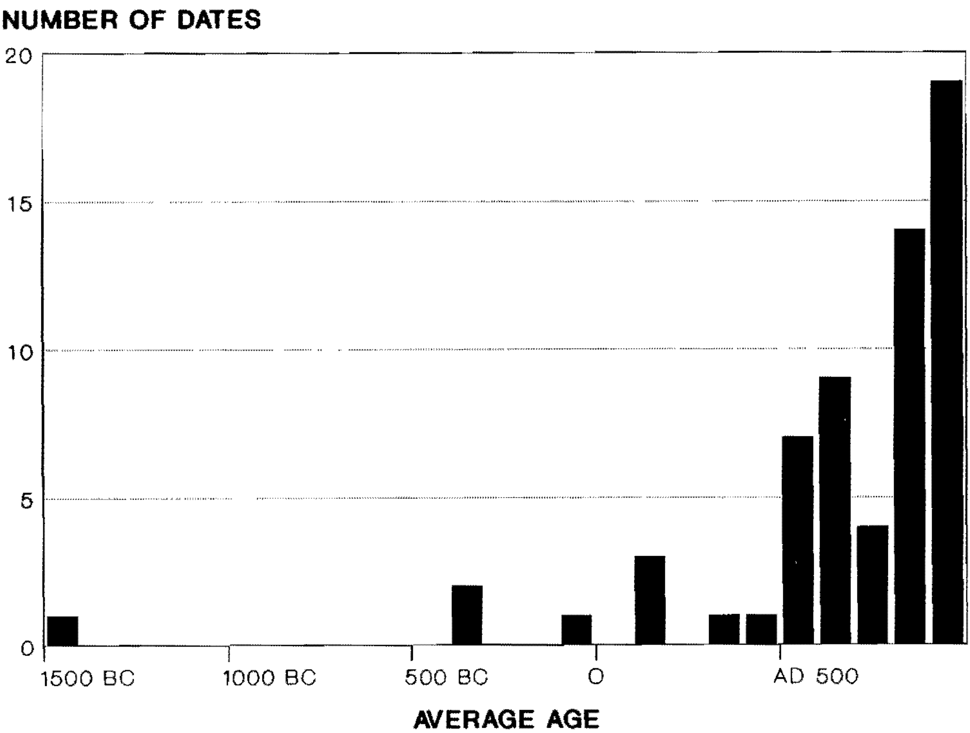

Fig. 3. Frequency of calibrated radiocarbon dates by *average* ages in 100-year intervals prior to A.D. 1000.

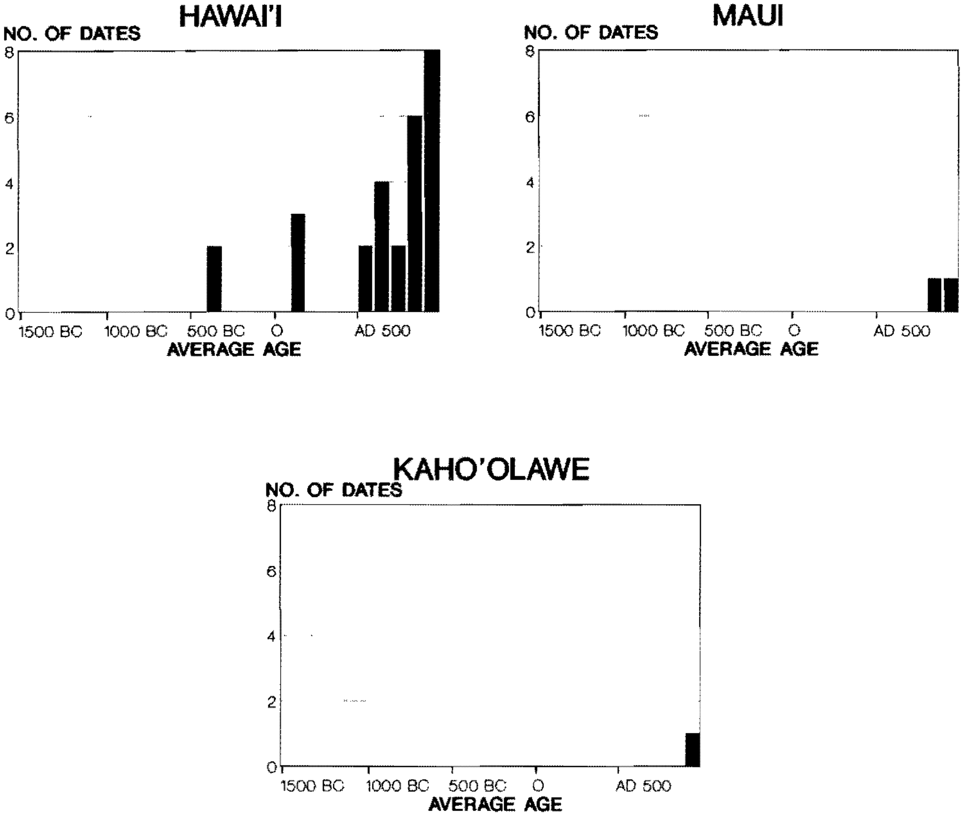

Fig. 4. Frequency of calibrated radiocarbon dates by *average* ages in 100-year intervals prior to A.D. 1000 (n = 30) by individual island.

remaining 24 are from wood charcoal samples. The marine samples are from only two sites, the Pu'uali'i Sand Dune and the Wai'Ahukini Rockshelter, both near Ka Lae (South Point) in the Ka'ū District.

The Pu'uali'i Sand Dune Site (H-1) at Ka Lae has yielded ten dates that calibrate to ages prior to A.D. 1000. One of these dates (Gak-258 on charcoal) falls within the first millennium B.C. Another date (Grn-2225 on charcoal) ranges from cal A.D. 127–249 (range with highest probability), and might represent the age of initial occupation of the site (Kirch 1985:82–85). The H-1 Site, long the focus of dating efforts, yields some of the earliest Hawai'i Island dates. However, the site has produced widely variable ages from samples apparently collected from the same stratum. The age disparities within and between strata at H-1 were recognized by Emory and Sinoto (1969) when they suggested that ancient driftwood used as firewood would result in variable (especially spuriously early) ages for a single stratigraphic context. This problem can be overcome in future work with taxonomic identification of a portion of the wood charcoal sample prior to radiocarbon analysis. Additional dating of materials excavated from Pu'uali'i may help to resolve the chronology for this important site.

Wai ʻAhukini, also near Ka Lae is among the best-dated early sites, with 15 determinations calibrated to ranges into the first millennium A.D. at one standard deviation. Both calibrated charcoal and shell dates indicate a chronology that may begin as early as the mid-second century A.D. Most dates from Wai'Ahukini (Layer II) have ranges that suggest a chronology from approximately A.D. 600 to 1000.

The remaining 13 early Hawai'i Island dates come from eight excavation localities on the leeward coasts, and from Streck's (1986) work at Pōhakuloa in the Mauna Kea–Mauna Loa Saddle region. The earliest of these miscellaneous dates is from a cave site at Keauhou, Kona. This date reported by Soehren ranges from cal A.D. 54–239.

Hawai'i Island has a large number of early radiocarbon dates. A few observations are noteworthy. First, five dates from five sites are earlier than A.D. 200 in average age. The problem, however, of dating ancient driftwood must be dealt with in future work, especially in the case of coastal sites. Second, the Hawai'i Island dates show that settlement was widespread (and thus more likely to be encountered archaeologically), with people occupying what many prehistorians have regarded as less than optimal environmental zones (i.e., dry leeward areas) (Fig. 1). Third, very little work has been done in windward areas of Hawai'i Island (e.g., Waipi'o Valley) where early settlements might be expected. Fourth, the extensive nature of Polynesian settlement and land use prior to A.D. 1000 suggests colonization occurred several centuries earlier.

Maui Island

Maui has four early radiocarbon dates (Table 1; Figs. 1, 4). The earliest (cal A.D. 770–980) on charcoal comes from Hōlua Rockshelter in Haleakalā Crater. Soehren excavated this site in the 1960s and interpreted it to be a shelter of only temporary use. Dates of similar age from Kēōkea (cal A.D. 850–1000), Pu'unaio (on Polynesian rat bone, cal A.D. 898–1440), and Mākena (cal A.D. 980–1260) have been recently reported.

Three of the four early dates from Maui come from interior locations (Fig. 1). Like the Hawai'i Island evidence, the presence of early sites on the coast and interior suggests widespread Polynesian occupation of the island in the first millennium A.D. Earlier sites undoubtedly remain to be discovered and excavated on this large, well-endowed island.

Kaho'olawe Island

The small island of Kaho'olawe has yielded one early radiocarbon date (Table 1; Figs. 1, 4). The early date comes from an earth oven at a site in Kaulana Gulch excavated by Hommon (1983) and his associates. The date has a range of cal A.D. 867–996. No other early dates are available from this intensively studied island.

Lāna'i Island

There are no early dates presently known from the island of Lāna'i. Additional field work focusing specifically on the potential for early deposits could change the present chronology for Lāna'i.

Moloka'i Island

From Moloka'i a single date on charcoal (cal A.D. 559–694) comes from the lowest cultural stratum at the Hālawa Valley Sand Dune (Table 1; Figs. 1, 5). This site was excavated and reported in detail (Kirch and Kelly 1975). The Hālawa Valley Dune Site has provided significant artifactual and ecological evidence for early Hawaiian prehistory. Although no other early radiocarbon-age determinations are known for Moloka'i (see Weisler 1989 for a recent comprehensive overview), it is likely that even earlier sites await excavation, especially in the windward valleys along the island's north coast.

O'ahu Island

There are currently 29 early dates from 17 O'ahu site localities (Table 1; Figs. 1, 5). All of these radiocarbon-age determinations have been made on charcoal samples. Most of these dates have come from recent excavations, with the exception of the Bellows (0-18) Site, Kahana Valley, and Emory's Kuli'ou'ou Rockshelter excavations.

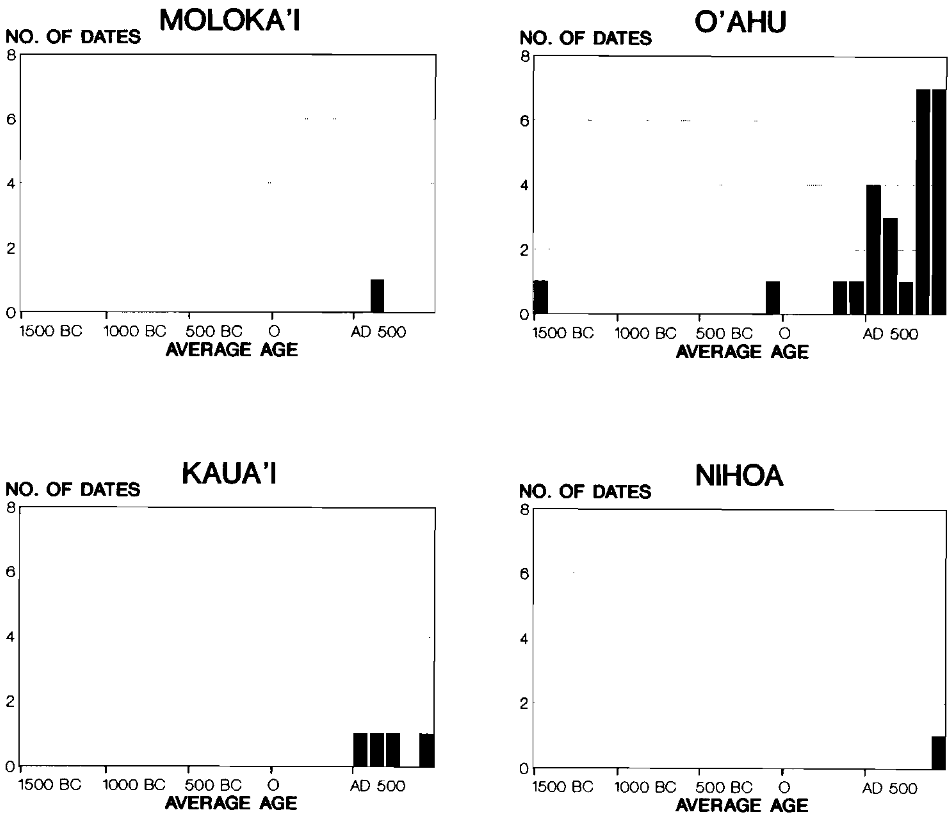

Fig. 5. Frequency of calibrated radiocarbon dates by *average* ages in 100-year intervals prior to A.D. 1000 (n = 32) by individual island.

The earliest date for O'ahu is from Hale'iwa (BPBM ^{14}C file; Table 1) at cal 1522–1376 B.C. This date clearly stands as an outlier to other Hawaiian dates, and the problem of dating ancient driftwood might offer an explanation. The next earliest date comes from charcoal excavated by Bath et al. (1984) at Kahuku Point. This date ranges from cal 45 B.C. to A.D. 32 as most probable at one standard deviation. Other early dates come from Davis and Haun's (1987) work at West Beach. Their three dates on charcoal range from approximately A.D. 400–700. Other dates in the early to mid-first millennium A.D. from O'ahu include two from Luluku (c. A.D. 500–700), three from Kawai Nui Marsh (c. A.D. 500–800), two from Kahana Valley (c. A.D. 500–800), and one from Kaka'ako (cal A.D. 560–780). O'ahu dates in the latter first millennium A.D. come from Bellows Beach, Kāne'ohe, Waikalua, Mokulē'ia, Maunawili, Kāne'īlio Point, Barbers Point, and Kuli'ou'ou Shelter.

A few observations should be noted for O'ahu's early radiocarbon chronology. First, one date obtained by Bath et al. (1984) from Kahuku is near the time of Christ and may represent early human presence on O'ahu. Second, as with the Hawai'i Island dates, settlement and land use are widespread centuries before the close of the first millennium A.D. Third, the number of early to mid-first millennium A.D. dates for O'ahu is suggestive of colonization as early as the first two centuries of the Christian era. Additional field research may yield more radiocarbon dates in these early centuries.

Kaua'i Island

Four early charcoal dates come from the island of Kaua'i (Table 1; Figs. 1, 5). The earliest of these dates at cal A.D. 390–640 comes from Pā'ā (Kōloa District). Other early dates in the mid-first millennium A.D. come from Lumaha'i and Hanalei, Halele'a District.

Nihoa Island

There is a single early date from distant Nihoa Island of cal A.D. 867–1037 (Table 1; Fig. 5). The sample dated is reported as coming from a hearth in front of a bluff shelter in 1955 by Emory and his associates (Emory et al. 1959: viii). Little more is known about this date. An early date from this remote island adds to a picture of Polynesian colonists ranging widely in the Hawaiian Islands.

DISCUSSION

What do the early radiocarbon dates presently available tell us about the beginnings of Hawaiian prehistory? In addressing this question, some interpretive considerations are offered and some general problems that remain unresolved are discussed.

First, charcoal is an artifact. This use of the term "artifact" follows a liberal definition as *anything that owes its form or position to human activity*. The artificial nature of charcoal (in particular, carbonized wood) is based on the assumption that natural fires, such as those caused by lightning, are rare in the Hawaiian Islands. Natural fires caused by volcanic eruption should in most cases be accompanied by the products of vulcanism and thus easily detectable to archaeologists. Charcoal, however, is often a *sedimentary* particle in the sense that it is transported from an original source to a new environment of deposition. The notion of secondary context is the familiar concept for archaeologists. This means that radiocarbon dates provide an age for the death of an organism and ideally its more or less contemporaneous carbonization through human activity. The fact that in some cases carbonized particles are transported and deposited anew means that human activity is dated, but not the activity necessarily associated with the excavated context. In light of this consideration, even dates seemingly "out of context" may be telling us something about the presence of people and their use of the surrounding landscape.

Second, the earliest sites in Hawai'i are those that have had the most time for destruction by nature and the activities of prehistoric and modern people, and for deep burial by colluvial and alluvial sedimentation. Finding and dating early occupations in Hawai'i is the problem of sampling the rarest phenomena in a population. Probability theory states that rarest phenomena are correspondingly difficult to encounter in samples, especially in relatively small ones (compare Figs. 3, 4, and 5). Furthermore, the samples used from the archaeology of Hawai'i are far from representative. The bulk of field work today is contract archaeology, conducted primarily in leeward zones—environments that might not, in all cases, have been settled until somewhat later than well-watered windward areas.

Third, in spite of the real potential for erroneously early dates, we must be careful that current predilections about what is "too early" do not seriously bias our interpretations. Some dates will indeed be anomalous; that is, they will date events such as the death of a tree on the northwest coast of America that becomes driftwood and is used as firewood in Hawai'i. However, this problem can potentially be remedied by the taxonomic identification of wood charcoal prior to submitting samples for age determination.

With these considerations in mind, the 78 early dates from seven islands might be suggestive of a human presence as early as the first century A.D. (Figs. 2 and 3). Additional work with careful attention to questions of early chronology for Hawai'i will help to resolve this issue.

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